NARROWBAND GENERATION IN A PLASMA RELATIVISTIC MICROWAVE emitter [[1]](#footnote-1)\*)

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Ivanov I.

Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russian Federation

The operation of a plasma relativistic emitter in the free-running mode is considered. The electron energy of the beam is 0.49 MeV, the beam current is 2.4 kA, and the plasma density in the system is 2 · 1012 cm – 3. In contrast to [1, 2], the base cavity length *L*0 is reduced to 0.4 m, Fig. 1. This made it possible to obtain rather simple spectra and generation on a small number of longitudinal modes, Fig. 2. The experimental spectra of microwave radiation in the range 2 - 4 GHz with a duration of up to 300 ns at various values of the plasma density are presented. According to the graphs of instantaneous frequency, Fig. 3, it is possible to determine the generation frequency at an appropriate point in time. During a single pulse, generation, as a rule, occurs at several frequencies, but not simultaneously, but at each moment in time at one frequency. The repeatability of the spectra under the same initial conditions in different pulses is not observed. A technique is proposed for determining the effective cavity lengths for various longitudinal modes.

*L*0

200

1210

620

1

2

3

4

Fig. 1. Diagram of the working part of the emitter. L0 = 0.39m - the base cavity length. 1 - a tube with a reflective disk, 2 - a waveguide, 3 - a collector, 4 - a horn.



Fig. 3. Graph of instantaneous frequency (1) and envelope of the square of the amplitude of the waveform of the microwave pulse (2)

Fig. 2. The generation spectrum for the entire duration of the recording of the waveform

References

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2. Ivanov I.E. Plasma Physics Reports, 2019, Vol. 45, No. 7, pp. 662–673.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/Pt/ru/GJ-Ivanov.docx) [↑](#footnote-ref-1)